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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION – JAN 2023

Course Code : PET-1006

Course Name: Overview of Energy Industry

Program : B.Tech

Date: 28-JAN-2023

Time: 09.30 AM to 12.30 PM

Max Marks: 100

Weightage: 50%

Instructions:

- (i) *Read the question carefully and answer all the questions*
 - (ii) *Scientific calculator is allowed*
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Part A [Memory Recall Questions]

Answer all the Questions. Question carries THIRTY marks.

(1Qx30M=30M)

1. Answer all the questions

- i. What is clastic and non clastic rock? Give example.
- ii. Full form of OPEC is -----? Write the functions of OPEC.
- iii. How does gas turbine produce electricity? What are the fuels for thermal power plant?
- iv. How will you get the different products from crude oil? What are the main products from crude oil?
- v. What do you mean by upstream, midstream and downstream sectors in oil and gas industries?
- vi. Select the correct option
 - (a) Solar cooker is a device which converts solar energy to ----- energy.
 - a. Electrical
 - b. Thermal
 - c. Sound
 - d. all the above
 - (b) Largest producer of crude oil is -----
 - a. USA
 - b. Russia
 - c. China
 - d. Saudi Arabia

(c) Largest wind energy station India is located in

- a. Gujrat
- b. Rajasthan
- c. Tamilnadu
- d. Maharashtra

vii. (1) Assertion (A) : Fossil fuel resources are normally formed from the remains of dead plants and animals. Reason (R) : They are often referred to as fossil fuels and are formed from hydrocarbon.

- (a) A and R are correct and R explains A
- (b) A and R are correct but R does not explain A
- (c) A is incorrect but R is correct
- (d) Both A and R are incorrect

(2) Assertion (A): Natural gas is found with petroleum deposits.

Reason (R): it can be used as a domestic and industrial fuel.

- (a) A and R are correct and R explains A
- (b) A and R are correct but R does not explain A
- (c) A is incorrect but R is correct
- (d) Both A and R are incorrect

viii. What are the main properties of reservoir rock?

ix. Fill in the blanks

- (a)..... are resources that exist without action of humankind.
- (b)..... resources harvested and used rationally will not produce pollution.
- (c) Hydro electric power is a resource.

x. Match the following.

Column A	Column B
a. Hydro power	i. Sun
b. Renewable energy	ii. Turbine
c. Solar panel	iii. Tidal energy

Part B [Thought Provoking Questions]

Answer all the Questions. Questions carries TEN marks.

(4Qx10M=40)

2. Renewable energy resources has advantage over nonrenewable energy. List minimum two renewable energy resources and two non-renewable energy resources. Discuss how you can produce energy from these resources? . (C.O.NO 2) [Comprehension]
3. "Coal is considered to be a nonrenewable energy resources." Justify this statement. Classify the coal based on time of deposit and calorific value. How can you use coal to produce thermal power station to produce electricity. (C.O.NO 2) [Comprehension]
4. Semiconductors are used for solar panels. What do you mean by semiconductor? Which Semiconductor is broadly used? What are the different types of semiconductors? Explain the formation of different types of semiconductors with proper diagram. (C.O.NO 3) [Comprehension]
5. Briefly explain the stages of oil and gas life cycle. What are the methods available for oil and gas exploration? Which method is mostly used for oil and gas exploration and why? (C.O.NO 4) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Questions carries TEN marks.

(3Qx10M=30)

6. To meet the power requirement in Presidency University, suppose steam turbine is installed at University. Air enters the compressor of an ideal air standard Brayton cycle at 120 kPa and 320K with a volumetric flow of 5 m³/sec. The compressor pressure ratio is 10. The turbine inlet temperature is 1450 K. Assume $\gamma=1.37$ for air, $\gamma=1.25$ for gas, C_p [air] = 1.005 kJ/(kg.K), and C_p [gas] = 1.05 kJ/(kg.K), determine
 - a. Thermal efficiency of the cycle
 - b. Compressor work done
 - c. Turbine work
 - d. work ratio(C.O.NO 2) [Application]
7. In your class room there are 10 fans, each having 80 watt power consumption and 10 tube light, each having 55 watt power consumption. All the fans and tube lights are switch on from 9 AM to 5 PM and number of working days in the month of April are 20. Find the electricity bill for the month of April if the rate of electricity in Karnataka state is 10 Rs/ unit. (C.O.NO 1) [Application]
8. (i) To meet the power requirement of Presidency University, solar cells of size (10 cm x 10cm) are installed. Each solar cell produces a voltage of 0.5 V and a current up to 2.5 A. If the solar insulation is 800 W/m², find the efficiency of the solar cell.
(ii) If the efficiency of the solar cell is 16% and power requirement is 500 MW, find the space requirement for the solar cells. (C.O.NO 3) [Application]